A Life Cycle Assessment of Greenhouse Gas Emissions for Almond Processing and Distribution in California

Project Leader: Alissa Kendall
Department of Civil and Environmental Engineering, University of California, Davis, One Shields Ave., Davis, CA 95616
(530) 752-5722, amkendall@ucdavis.edu

PROJECT SUMMARY

Objectives:

- The objective of this project is to apply life cycle assessment (LCA) to model greenhouse gas (GHG) emissions, criteria air pollutants, and energy consumption resulting from California almond processing and distribution, and link these LCA outcomes to previous modeling of almond production and hulling and shelling. Linking these previous modeling results will provide total life cycle results for almond products at their point of entry to major importing regions, allowing for retailers or consumers to understand the energy and greenhouse gas footprint of almonds at their point of entry to markets around the world.

Background and Discussion:

California almond growers have to contend not only with significant environmental variables, but also with a complex regulatory environment. Accordingly, in running operations and formulating their business plans, they have to take into account such factors as energy use, GHG emissions, and other forms of air pollution in both the short and long run. This project is designed to furnish growers, handlers and others in the almond industry with a model that will enable them to better understand the production processes and practices that contribute to GHG emissions, air pollution and energy use.

In previous years we created an almond orchard management model to simulate the life cycle energy and resource inputs and waste, pollution, and co-product outputs, such as prunings and wood from removed trees. The LCA model results showed that irrigation and fertilization use were the largest contributors to energy consumption in almond production, and that using orchard biomass in bioenergy applications was critical to improving the greenhouse gas and energy performance of almonds.

In 2013-2014, we initiated research to expand this model to include processing of almond products and distribution. Progress to date has included the collection of information on processing steps for different products (blanched, salted, roasted, etc. almonds). Next steps will include survey-based data collection from processers and distributors and the completion of the processing and distribution LCA models.

This new phase of research will allow calculation and reporting of life cycle GHG emissions, criteria air pollutants, and energy per unit of product at its point of entry to foreign markets or point of distribution prior to retail in the domestic market. This will provide environmental and energy indicators that are relevant to interested retailers and consumers.

Project Cooperators and Personnel: Sonja Brodt, Agricultural Sustainability Institute, University of California, Davis
Graduate Student Researcher: Katherine Hoeberling, International Agricultural Development, University of California, Davis

For More Details, Visit

- Poster location 74, Exhibit Hall A + B during the Almond Conference; or on the web (after January 2015) at Almonds.com/ResearchDatabase
- 2013-2014 Annual Reports CD (13.AIR8.Kendall); or on the web (after January 2015) at Almonds.com/ResearchDatabase
- Related projects: 14-AIR2-Smart; 14-PREC1-DeJong; 14-STEWCROP4-Kimmelshue, 14-PREC6Smart